GENERAL SCIENCES

Agricultural Extension Bulletin No. 62

UNIVERSITY OF SASKATCHEWAN
COLLEGE OF AGRICULTURE

ONE WEEK LOAN
UNIVERSITY OF ALBERTA

THE GROWING OF FLAX

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Flax is a cash crop which is not well understood in Western Canada. The present situation is favorable to the use of flax as a supplementary cash crop to replace a portion of the wheat acreage.

Why is the present time favorable for flax production? Before the Great War Canada produced 11% of the world's flax seed and three-quarters of this amount was grown in Saskatchewan. Ten years ago Canada produced 9,675,000 bushels of flax seed but this dropped gradually until it reached the low figure of 910,400 bushels in 1934. Domestic use of flax seed in Canada amounts to about 2,500,000 bushels or nearly three times the 1934 production. Ten years ago Canada exported several million bushels a year, much of which went to the United States, but now Canada not only does not export flax but has to import it. The United States has for the past ten years had an average annual consumption of 32,606,800 bushels of flax seed. Of this total 16,097,400, or almost exactly half, was grown in the United States, mostly in the Dakotas, and 16,509,400 bushels were imported. Most of the imported flax was supplied by Argentina. Canadian farmers should be able to compete successfully with Argentina in the supplying of flax seed to the United States for the Canadian flax is higher in general value and Western Canada is reasonably close to the factories of the Midwestern States. Flax production in Saskatchewan has dropped to a low point for various reasons, chief among them being (1) the great interest in wheat, (2) the lack of clean new breaking, (3) late sowing, (4) dirty seed, (5) diseased soil and (6) lack of knowledge on how to grow the crop. However, now there are several factors favoring a steady increase in flax seed production, namely: (1) decreased interest in wheat, (2) disease resistant varieties of flax, (3) a much fuller knowledge of how to grow flax and (4) a probable strong demand for flax for several years to come.

Flax growing is distinctly a different proposition than wheat growing and a farmer is advised not to attempt growing the crop unless he is prepared to give it the special treatment it requires. The fact that the various experiment stations and many individual farmers find flax production profitable speaks for itself.

Those who are interested in flax as a possible crop on their farms ask various questions in their letters to the University and the experimental farms. Questions are also asked as to the probable causes of failure or partial failure with flax. In the following the more important questions will be discussed.

General

1. *Can flax be grown with the use of the same farm implements as required for wheat?*—Yes, the same fanning mill, drill, harvesting machinery and separator.

2. *What yields are to be expected from flax as compared with wheat?*—The average yield on clean summer fallow at Saskatoon for the period 1925 through 1934 was 19.0 bushels per acre for flax and 30.4 bushels per acre for Marquis wheat. The highest flax yield was 29.0 bushels in 1927 and the highest Marquis yield was 51.0 bushels in 1928. The lowest flax yield was 10.3 bushels in 1933 and the lowest Marquis yield was 9.4 bushels in 1933. These figures show that flax yielded more than half as well as wheat on the average and better than wheat in the extremely dry season of 1933. Farmers have frequently reported flax yields of around

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20 bushels per acre. The general average yield in Canada for the period 1925 through 1934 was 7 bushels per acre for flax and 15.4 bushels per acre for spring wheat. The large difference is accounted for in part by the fact that wheat is usually sown early, giving it a good opportunity to yield well, whereas flax has usually been sown late with insufficient attention paid to soil preparation and freedom from weeds in the seed and soil.

3. *In what parts of Saskatchewan is flax seed production the safest proposition?*—That depends upon conditions. During the years when there was much new breaking flax was grown satisfactorily in most of the settled areas of the province. During the past ten years production has been chiefly in the south central, central and west central crop districts of Saskatchewan. Unless one is experienced as a flax grower it would be unwise to risk growing the crop where attack from cutworms or grasshoppers is expected or where soil drifting is likely. Clean summer fallow in the park belt should furnish the best opportunities for success with flax.

4. *Is flax as easily grown as wheat?*—Not usually; however, where clean seed and reasonably clean moist land are available, where severe soil drifting and epidemics of insect pests are not probable and where early sowing is possible, flax is grown with very little difficulty.

5. *How does flax compare with wheat as to price?*—During the past two years flax seed has sold at Saskatoon for approximately twice the price of wheat in less than carload lots. When shipped in car lots, both the bushel price and the freight per hundred pounds must be considered, as the freight on flax is much less in proportion to value than on wheat. The present outlook is for the price of flax to maintain its strength. If there is a resumption of anything like 1929 activity in the building trades the price of flax should rise appreciably. If the cost of threshing and hauling to market are considered, flax has the disadvantage of higher threshing costs than wheat and the advantage of a lower cost of hauling.

6. *Is flax hard on the land?*—No. When flax seed polluted with weed seeds is sown or when flax is sown on weed infested soil, weeds make a strong growth and probably take much more moisture and plant food from the soil than does the flax. Then again, most of the flax sown in the past has been of varieties highly susceptible to wilt, a soil-borne disease, and successive crops of flax on the same land give poorer and poorer yields due to the ravages of the disease even though several years elapse between successive croppings. The new varieties of flax available are fully resistant to this disease.

Soil Preparation

7. *Is the soil prepared the same for flax as for wheat?* Flax requires an even, firm, moist seed bed. Wheat does best with such a seed bed but will suffer less than flax from a poorer seed bed as the young seedling has much more strength in pushing through the soil than has the flax seedling.

8. *Why should flax be sown only on land which is as free as possible from weeds?*—Flax is not a cereal crop with an extensive fibrous root system, but instead is an entirely different sort of plant with a smaller root system and relatively a small amount of top growth. The experience of farmers as well as the results of weed control experimentation at the University of Saskatchewan show flax to be a poor competitor of weeds, particularly of the noxious annual weeds.

Choice of Variety

9. *Does it make much difference what variety is used?*—Yes, a great deal of difference. Until recently practically all of the flax used in Saskatchewan belonged to the varieties Premost and Crown, both of which are highly susceptible to the wilt disease. On account of the wilt these varieties give reduced yields when grown more than once on the same land. Bison flax on the other hand is a new variety which is highly resistant to wilt. The distribution of Bison in this province was commenced in 1930 and there is now a fair amount of seed available. On land that has not grown flax previously Bison equals Crown and Premost in yield. On wilt infested soil at Saskatoon, Bison outyields these susceptible varieties enormously. Land which has produced more than one flax crop usually harbors flax wilt.

Preparation of the Seed

10. *How free from weed seeds should flax be when it is to be used for seed?*—The fact that flax will not fight weeds very successfully demands that all seed sown should be as free from weed seeds as it is possible to get it. Flax often looks clean even when it contains thousands of weed seeds per bushel. Test your seed by examining a cupful spread out on a large piece of white paper or send a sample to the Dominion Seed Laboratory, Federal Building, Saskatoon, for a purity test.

11. *Is it difficult to remove weed seeds from flax seed?* No. Proper use of the proper weed screen on nearly all makes of fanning mills will result in satisfactorily clean seed. It is important to have the machine level and to give the weed seeds ample opportunity to pass through the weed screen. This is impossible if one tries to hurry by putting the flax through in too large a stream. A careful examination of the flax before cleaning will indicate which weed screen is the correct one to use in order to remove all of the weed seeds. Some small flax seeds will also pass through but the operator should be satisfied if 80 or 85 per cent. of the original amount of flax is retained as clean seed.

12. *Should flax be treated with formaldehyde before sowing?*—Seed treatment is for the control of wilt. The wilt resistant variety, Bison, should not be treated but it is advisable to treat susceptible varieties. Treatment only kills the disease organism on the seed and not that which is in the soil.

Time of Seeding

13. *What is the proper time to sow flax?*—Flax should be sown on clean breaking or summerfallow about ten days after the start of wheat seeding. In the case of the soil containing late starting weed seeds such as Russian thistle it is frequently advisable to delay sowing the flax until the late starting weed seedlings emerge from the soil and are killed by cultivation. This will seldom delay seeding beyond about May 25.

14. *When flax is sown early is it not likely to be badly injured or killed by frost?*—No. Flax variety tests have been sown at Saskatoon for the past twenty years during the period between May 8th to 18th without appreciable frost damage. Flax appears to be more frost resistant than wheat during the early seedling stage but if an extremely severe frost occurs when flax is at the two leaf stage it is possible that the crop would be killed. The chances of this occurring are small, and if it did the crop could be immediately re-seeded.

15. *Many people sow flax in June; is that satisfactory?*—Usually it is not satisfactory. One of the chief reasons why so little flax is grown in Saskatchewan is that most people sow it late. Late sown flax is more likely to be diseased (where a susceptible variety is used), will usually find it more difficult to compete with weeds, will yield less even on clean soil, may be much more difficult to harvest and to thresh and will usually show a lower grade owing to the presence of frosted grain from the late blossoms.

16. *What is late sowing for flax?*—Flax sown in the southern part of the province after June 1st and in the central, eastern and northern parts after May 25th may be considered late sown and will in general be much less satisfactory than early sown flax.

Amount to Sow

17. *How much flax should be sown per acre?*—From 30 to 40 pounds per acre is usually satisfactory. In case of doubt as to the germination percentage or the presence of cut worms, sow more heavily. At Saskatoon excellent results are obtained from sowing 35 pounds per acre.

Depth of Sowing

18. *What is the best depth for sowing flax?*—On firm even soil which is moist almost to the surface, the flax seed should be sown 1 to 1½ inches deep in order to insure that all of the seed is placed in moist soil.

19. *If one plans to sow fifty acres of flax and the soil on May 10th is dry to a depth of three inches but moist below that, what should be done?*—The soil should be well packed; if then the soil is moist to within 1½ to 2 inches of the surface the flax may be sown. If not it would be best to delay sowing until after a satisfactory rain. If the rain is late in coming and weeds start, the weeds should be destroyed before any flax is sown. If the rain does not come until after June 1st it would be better to leave the flax unsown and substitute barley or early oats.

Method of Sowing

20. *What method of sowing is preferred?*—Any method is satisfactory that places the seed in firm moist soil at 1 to 2 inches below the surface. A press drill is very satisfactory. A single disk drill should be followed with a packer or some sort of packing device. At Saskatoon a double disk drill with the drag chains removed, places the flax seed in moist soil without covering it too deeply.

21. *Why should flax be sown only into firm moist soil?*—Because sowing into partly loose or partly dry soil gives an uneven patchy stand where weeds will have an excellent opportunity to develop and both the yield and grade of the flax crop will

suffer. Sowing deeply (three inches or deeper) into dry soil is very unsatisfactory for emergence is poor and uneven and frequently a heavy rain results in a caked surface before the flax emerges. If the latter happens it is necessary to break the crust immediately with the harrows, as the flax seedlings cannot force their way through much of a crust.

Care of the Crop

22. *Can flax be protected against cutworms and grasshoppers?*—Poisoned bait applied in the proper manner will afford protection from the red back cutworm and from grasshoppers. Detailed instructions are obtainable from the Dominion Entomological Laboratory at the University of Saskatchewan.

Harvesting and Threshing

23. *Is flax difficult to cut?*—Early sown flax is not at all difficult to cut when it is fully ripe. Flax makes a good combine crop as it does not shatter easily. When a binder is used no twine is necessary. Some people remove the packing and binding parts and substitute a flax attachment but this is not essential. Late sown flax often continues to blossom until late in the fall and the stems never get thoroughly ripe. Such material is difficult to cut owing to the toughness and gumminess of the unripe flax.

24. *Is flax difficult to thresh?*—Early sown flax usually is easy to thresh because it becomes fully mature before it is harvested. Two to four rows of concave teeth should be used according to the condition of the flax. The threshing machine should be operated a little under regular speed in order to control the cleaning at the shoe and prevent possible loss of flax seed with the straw. Loose flax should be pitched evenly in small forkfuls into the feeder. A flax sieve with 5-32 inch round holes should be placed level below the adjustable sieve to facilitate cleaning. When the flax is tough, six rows of concave teeth should be used and the normal speed of the machine should be maintained. Late sown flax is usually difficult to thresh on account of the presence of unripe material.

25. *How does flax stand after-harvest weathering?*—Flax is far superior to wheat, oats or barley in resistance to weather damage. In experiments at Saskatoon, flax and wheat were left standing side by side after they were ripe. After several days of wet weather the wheat was badly bleached, whereas the flax showed no appreciable deterioration. Stooked or windrowed flax will retain its brightness and color after wheat, oats and barley have become badly bleached and discolored. Flax is highly resistant to after-harvest sprouting and will stand being left until spring unthreshed in the field far better than the cereals.

Flax and Wheat in Combination

26. *Is it advisable to sow flax with wheat as a combination crop?*—Not if there is a reasonably good chance of growing a good crop of flax alone. Combination cropping is a method of growing flax. At Saskatoon a good combination results from sowing a half a bushel each of flax and wheat, the two crops being sown together. Some people sow the wheat and flax separately to avoid getting the flax in too deeply. Crown and Bison flax take approximately the same time to mature as Marquis wheat.

The advantages of combination cropping are: (1) if wireworms are present they damage the flax much less than the wheat, (2) if cutworms are present they damage the wheat less than the flax, (3) if a crust forms before the flax emerges the wheat seedlings will break it, thereby acting as a nurse crop, (4) the wheat aids the flax in competing with weeds; and (5) the crop is easier to cut than flax alone.

The disadvantages of combination cropping are: (1) to insure a good job of sowing it is sometimes necessary to sow the wheat and flax separately, (2) the wheat and flax must be separated when marketed, (3) the small pieces of broken wheat remaining in the cleaned flax lower the value and grade of the flax as the percentage of oil extracted is lowered through the absorption of oil by the wheat particles.

Summarized Pointers on Flax Growing

1. Do not grow flax unless you are fully prepared to give it the special treatment required.
2. Sow early, that is about ten days after wheat seeding commences.
3. Sow only on firm moist soil which is comparatively free from weed seeds and weed plants.
4. Sow only highly clean seed.
5. Sow a wilt resistant variety if possible.
6. Sow not deeper than 2½ inches.
7. Make the proper adjustments on the threshing machine before commencing on flax.

Saskatoon, March, 1935.